

References are NOT in Agreement with UMLR dated 09 October 2006

UTILITY HORIZONTAL DIRECTIONAL DRILLING
05/08

NOTE: This guide specification covers the requirements for directional drilling systems, equipment, piping and procedures.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

1.1 REFERENCES

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO T 180

(2001; R 2004) Moisture-Density Relations
of Soils Using a 4.54-kg (10-lb) Rammer
and a 457-mm (18-in) Drop

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926.652

Safety and Health Regulations for
Construction; Subpart P, Excavations;
Requirements for Protective Systems

1.2 SUBMITTALS

NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Keep submittals to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Submittal items not designated with a "G" are considered as being for information only for Army projects and for Contractor Quality Control approval for Navy, Air Force, and NASA projects.

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES in sufficient detail to show full compliance with the specification:

SD-01 Preconstruction Submittals

Submit Statement of Qualifications and Records or previous similar

jobs.

Submit [Soil Test Data](#) prior to commencement of drilling/excavation work.

[SD-02 Shop Drawings](#)

Submit an electronic copy and three hard copies of the [record drawings](#) to the Contracting Officer within five days after completing the pull back. The record drawings must include a plan, profile, and all information recorded during the progress of the work. The record drawings must be clearly tied to the project's survey control

[SD-03 Product Data](#)

Submit [Manufacturer's Catalog Data](#) for the polyethylene pipe.

[SD-07 Certificates](#)

Submit certified statement that Subcontractor has inspected the drill rod and determined that the drill rod is in satisfactory condition for its intended use.

[SD-08 Manufacturer's Instructions](#)

Submit a complete list of all drilling fluids, additives, and mixtures to be used along with [Material Safety Data Sheets](#).

[SD-11 Closeout Submittals](#)

Maintain and submit upon completion all [work complete logs of guided directional drill operations](#).

1.3 COMMENCEMENT, DELIVERY, STORAGE, AND HANDLING OF MATERIALS

Prior to commencement of the work, Subcontractor must submit the following to the Engineer of Record for review and approval:

[Manufacturer's Catalog Data](#)
[Material Safety Data Sheets](#)
[Statement of Qualifications and Records](#)
[Soil Test Data](#)

[AASHTO T 180](#)

Inspect materials delivered to the site for damage. All materials found during inspection or during the progress of work to have cracks, flaws, surface abrasions, or other defects must be rejected and removed from the job site.

Disposal of fluids is the responsibility of the Subcontractor. Dispose of fluids in a manner that is in compliance with all permits and applicable federal, state, and local regulations. The Subcontractor may dispose of the drilling fluids on approved land owned by the Government. The drilling slurry must be spread over the Government-approved disposal area and plowed into the soil.

1.4 QUALIFICATIONS

The Subcontractor and his field supervisor assigned to this project must be experienced in work of this nature and must have successfully completed similar projects of similar length, pipe type, pipe size, and soil type using directional drilling in the last three (3) years. As part of the bid submission, submit a description of such project(s) which include, at a minimum, a listing of the location(s), date of project(s), owner, pipe type, size installed, length of installation, type, and manufacturer of equipment used, and other information relevant to the successful completion of the project.

1.5 SAFETY

Directional drilling equipment machine safety requirements must include common grounding system to prevent electrical shock in the event of underground electrical cable strike. The grounding system must connect all pieces of interconnecting machinery; the drill, mud mixing system, drill power unit, drill rod trailer, operators booth, worker grounding mats, and any other interconnected equipment to a common ground. The drill must be equipped with an "electrical strike" audible and visual warning system that notifies the system operators of an electrical strike.

PART 2 PRODUCTS

2.1 DRILL ROD

Select the appropriate drill rod to be used. Inspect and approve the drill rod for use prior to arrival at the work site.

2.2 PRODUCT

The product pipe to be installed must be a [10-inch (nominal)][_____] diameter polyethylene pipe. The dimensions ratio of the pipe must be [11 (DR11)][_____].

2.3 DRILLING FLUIDS

Use a high quality [bentonite][_____] drilling fluid to ensure hole stability, cuttings transport, bit and electronics cooling, and hole lubrication to reduce drag on the drill pipe and the product pipe. Composition of the fluid must comply with all federal, state, and local environmental regulations.

Mix the [bentonite][_____] drilling fluid with potable water (of proper pH) to ensure no contamination is introduced into the soil during the drilling, reaming, or pipe installation process. The Subcontractor is responsible for any required pH adjustments.

Disposal of the drilling fluids is the responsibility of the Subcontractor and must be conducted in compliance with all relative environmental regulations, right-of-way and work space agreements, and permit requirements.

Drilling fluid returns can be collected in the entrance pit, exit pit, or spoils recovery pit. Immediately clean up any drilling fluid spills or overflows from these pits.

PART 3 EXECUTION

3.1 DRILL SET-UP AREA

The Subcontractor is responsible for design and construction of the drill entrance and exit pits.

3.2 DRILL ENTRANCE AND EXIT PITS

Drill entrance and exit pits are required and must be maintained at minimum size to allow only the minimum amount of drilling fluid storage prior to transfer to mud recycling or processing system or removal from the site.

Drilling mud must not be allowed to flow freely on the site or around the entrance or exit pits. Remove spilled mud as soon as possible and restore ground to origin condition. Shore pits in compliance with OSHA Standards, 29 CFR 1926.652

When drilling near wetlands or water courses, provide secondary containment to prevent drilling fluids from entering the wetlands approved by the Contracting Officer.

3.3 DRILL ENTRANCE AND EXIT ANGLE

Entrance and exit angles can be whatever the Subcontractor desires such that the elevation profile maintains adequate cover to reduce risk of drilling fluid breakouts and ground exit occurs as specified herein. Ensure that entrance and exit angles ensure pullback forces do not exceed [5][_____] percent strain on the [polyethylene][_____] pipe.

3.4 PILOT HOLE

The type and size of the pilot string cutting head and the diameter of the drill pipe is at the Subcontractor's discretion.

The pilot hole must be drilled along the path shown on the plan and profile drawings. Pilot hole tolerances are as follows:

- a. Vertical Tolerance: Provide minimum cover below channel bottom as specified on the plans. The Subcontractor may go deeper if necessary to prevent breakout.
- b. Horizontal Tolerance: +/- [60 inches][_____] from the centerline of the product pipe.
- c. Curve Radius: No curve is acceptable with a radius less than [1,000 feet].
- d. Entry Point Location: The pilot hole entry point must be within +/- [60 inches][_____] of the location shown on the drawings or as directed by the Contracting Officer in the field.
- e. Exit Point Location: The exit point location must be within +/- [60 inches][_____] of the location shown on the drawings or as directed by the Contracting Officer in the field.
- f. The installed pipeline cover requirements as shown on the drawings or as specified must not be violated.

3.5 REAMING

Conduct reaming operations at the Subcontractor's discretion. Determine the type of back reamer to be utilized by the type of subsurface soil conditions that are encountered during the pilot hole drilling operation. The reamer type is at the Subcontractor's discretion.

3.6 PULL BACK

Fully assemble the entire pipeline to be installed via direction drill prior to commencement of pull back operations.

Support the pipeline during pullback operations in a manner to enable it to move freely and prevent damage. Install the pipeline in one continuous pull.

Minimize torsional stress by using a swivel to connect the pull section to the reaming assembly.

Maximum allowable tensile force imposed on the pull section must not exceed [90] [_____] percent of the pipe manufacturer's safe pull (or tensile) strength. If the pull section is made up of multiple pipe size or materials, the lowest safe pull strength value governs and the maximum allowable tensile force must not exceed [90] [_____] percent of this value.

Minimize external pressure during installation of the pullback section in the reamed hole. Replace damaged pipe resulting from external pressure at no cost to the Government. Buoyancy modification is at the discretion of the Subcontractor.

3.7 CONNECTION OF PRODUCT PIPE TO WATER LINE

After the product pipe has been successfully installed, the product pipe must be allowed to recover for 24 hours prior to connection of the water line. The Subcontractor is responsible for ensuring that a sufficient length of the product pipe has been pulled through the hole so that the pull-nose is not pulled back into bore hole due to stretch recovery of the product pipe.

3.8 GUIDANCE SYSTEMS

Walkover guidance systems are not acceptable for this project.

A magnetic survey tool locator installed behind the pilot string cutting head and an electric grid (tru-tracker) system must be used for this project.

3.9 DOCUMENTATION

Maintain drilling logs that accurately provide drill bit location (both horizontally and vertically) at least every 2 inches along the drill path. In addition, keep logs that record, as a minimum the following, every 15 minutes throughout each drill pass, back ream pass, or pipe installation pass:

- a. Drilling Fluid Pressure
- b. Drilling Fluid Flow Rate
- c. Drill Thrust Pressure
- d. Drill Pullback Pressure

e. Drill Head Torque

The Contracting Officer or Contracting Officer's Representative must have access to instrumentation, readings, and logs at all times during operation.

3.10 UTILITY LOCATING AND MARKING

Locate and clearly mark all utilities prior to start of excavation or drilling. The Subcontractor is responsible for damage to utilities and must repair damaged utilities at no cost to the Government.

3.11 CLEANUP AND FINAL CLOSEOUT

Immediately upon completion of work of this section, remove all rubbish and debris from the job site. Remove all construction equipment and implements of service leaving the entire area involved in a neat condition acceptable of the Contracting Officer.

Immediately clean "blow holes" or "breakouts" of drilling fluid to the surface and return the surface area to its original condition. Dispose of all drilling fluids, soils, and separated materials in compliance with federal, state, and local environmental regulations.

Subcontractor must submit signed and sealed [record drawings](#), and signed final "[work complete logs of guided directional drill operations](#)".

-- End of Section --